

REMARKS

By way of this amendment, claims 1-15 and 26 are canceled as being directed to nonelected subject matter. Independent claim 16, the only pending independent claim, has been amended leaving claims 16-25 pending for reconsideration. Support for the amendment to define the reaction reactor as being endothermic is found in the specification at page 12, line 1. Support for the amendments to recite the hydrogen passing through the membrane as the mode of purification is found in the specification at page 13, lines 12-15. As such, it is submitted that no new matter has been added to the application by way of this amendment.

Currently, all the pending claims stand rejected under 35 U.S.C. §103(a) over Towler et al. (US 6,409,974) in view of Krumpelt et al. (US 6,967,063).

The basis of the rejection as articulated in Paper No. 121807 is that Towler teaches all of the claim limitations with the exception of the gas shift reaction occurring in a membrane reactor. Krumpelt is cited to bolster Towler in this regard for the teaching of a membrane water-gas shift reactor used to increase hydrogen concentration in a hydrogen-rich gas stream with citation to column 4. The basis for the rejection is that it would have been obvious to one of ordinary skill in the art to so combine the teachings of Towler with those of Krumpelt.

Applicant submits that the prior art reference combination fails to afford the claimed invention.

The shift reactor of Krumpelt operates in the context of an autothermal low pressure system in which the pressure is tightly controlled at subatmospheric values necessary to drive carbon dioxide through the membrane. As shown in Table 2 of Krumpelt, and the text found at column 4, lines 35-59, Krumpelt teaches a carbon dioxide separation membrane water-gas shift reactor to remove carbon monoxide and carbon dioxide by passing predominantly carbon dioxide

through the membrane and leaving hydrogen in a raffinate stream still containing unreacted alkanes. Towler as noted in the outstanding Office Action is silent as to a gas shift reaction occurring in a membrane reactor. Thus, the prior art reference combination yields a system with an endothermic reactor feeding a carbon dioxide separation membrane water-gas shift reactor passing carbon dioxide through the membrane.

In contrast to the prior art reference combination, pending independent claim 16 has been amended consistent with the specification teachings found on page 13, lines 12-15 to recite with greater clarity that the purified hydrogen flow is collected as having passed "through a membrane to a purified hydrogen side" of the water gas step membrane reactor. As the hydrogen obtained according to pending claim 16 has actively been passed through a membrane, the unreacted feedstock remaining with the hydrogen-rich gas of Krumpelt is greatly reduced thereby precluding the need for subsequent purification of the hydrogen to remove these alkanes or otherwise run the risk of potential coking or other contamination associated with later reaction of the hydrogen rich gas stream still containing residual alkanes. As such, it is respectfully submitted that the prior art reference combination fails to afford the claimed invention of independent claim 16 and reconsideration as to the patentability of this claim is requested. Applicant submits that pending dependent claims 17-25 which depend from claim 16 are likewise entitled to patentable weight on the basis of dependency from claim 16, now believed to be in allowable form. Additionally, Applicant submits that additional bases exist for the patentability of the subject matter of the dependent claims separate from dependency from independent claim 16. Applicant reserves the right to make arguments of record in the due course of prosecution with respect to the separate patentability as to the subject matter of dependent claims 17-25.

In light of the above amendments and remarks, reconsideration and withdrawal of the rejection as to claims 16-25 under 35 U.S.C. §103(a) over Towler in view of Krumpelt is requested. In the event that this rejection is maintained, it is respectfully requested that the resolution of ordinary skill in the art be stated with greater specificity.

Summary

Claims 16-25 remain pending in the application, of which only claim 16 is in independent form. Reconsideration and withdrawal of the rejection as to these claims and the passing of this application to allowance are requested. Should the Examiner have any suggestions as to how to improve the form of any of the pending claims, he is respectfully requested to contact the undersigned attorney in charge of this application to address those outstanding issues.

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Respectfully submitted,

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